

Amendments to the Claims:

Please amend claims 40, 45, 46, 47, and 60; and add claims 61-72. This listing of claims will replace all prior versions, and listings, of claims in the application:

1-28. (Canceled)

29. (Previously Presented) A method of producing L- β -lysine, comprising:

(a) culturing a prokaryotic host cell comprising an expression vector that encodes lysine 2,3-aminomutase in the presence of L-lysine, wherein the vector that encodes lysine 2,3-aminomutase has a nucleic acid sequence of SEQ ID NO: 3 and the cultured host cell expresses lysine 2,3-aminomutase, and

(b) isolating L- β -lysine from the cultured host cells.

30-36. (Canceled)

37. (Previously Presented) The method of claim 29 wherein the isolated L- β -lysine is enantiomerically pure.

38-39. (Canceled)

40. (Currently Amended) A method of producing L- β -lysine, comprising:

(a) immobilizing lysine 2,3-aminomutase on a suitable support, wherein the lysine 2,3-aminomutase has an amino acid sequence selected from the group consisting of (i) SEQ ID NO: 4, and (ii) a conservative amino acid variant of SEQ ID NO: 4 **having one or more conservative amino acid substitutions to about 72% sequence identity to SEQ ID NO: 4;**

(b) activating the lysine 2,3-aminomutase with cofactors required for lysine 2,3-aminomutase activity; and

(c) contacting L-lysine with the immobilized lysine 2,3-aminomutase to produce L- β -lysine.

41. (Previously Presented) The method of claim 40 wherein the L-lysine is contacted with the immobilized lysine 2,3-aminomutase for a sufficient amount of time to produce enantiomerically pure L- β -lysine.

42. (Previously Presented) The method of claim 37 further comprising separating the L- β -lysine from the L-lysine.

43. (Previously Presented) The method of claim 42 wherein the separation of the L- β -lysine from the L-lysine is achieved using high performance chromatography.

44. (Previously Presented) The method of claim 37 wherein the process is a continuous process.

45. (Currently amended) The method of claim 40[[37]] wherein the cofactors required for lysine 2,3-aminomutase activity comprise:

- (i) at least one of ferrous sulfate or ferric ammonium sulfate;
- (ii) pyridoxal phosphate;
- (iii) at least one of dehydrolipoic acid, glutathione or dithiothreitol;
- (iv) S-adenosylmethionine; and
- (v) sodium dithionite.

46. (Currently Amended) A method of producing L- β -lysine, comprising:

- (a) culturing a prokaryotic host cell comprising an expression vector that encodes lysine 2,3-aminomutase in the presence of L-lysine, wherein the cultured host cell expresses lysine 2,3-aminomutase, and
- (b) isolating L- β -lysine from the cultured host cells, wherein the lysine 2,3-aminomutase has an amino acid sequence selected from the group consisting of (i) SEQ ID NO: 4 and (ii) a conservative amino acid variant of SEQ ID NO: 4 **having one or more conservative amino acid substitutions to about 72% sequence identity to SEQ ID NO: 4.**

47. (Currently amended) A method of producing L- β -lysine, comprising:

(a) incubating L-lysine in a solution containing purified lysine 2,3-aminomutase, wherein the lysine 2,3-aminomutase has an amino acid sequence selected from the group consisting of (i) SEQ ID NO: 4, and (ii) a conservative amino acid variant of SEQ ID NO: 4 **having one or more conservative amino acid substitutions to about 72% sequence identity to SEQ ID NO: 4**, said solution containing all cofactors required for lysine 2,3-aminomutase activity; and

(b) isolating L- β -lysine from the incubation solution.

48. (Previously Presented) The method of claim 47, wherein step (b) further comprises isolating L- β -lysine from L-lysine via chromatography.

49-58. (Canceled)

59. (Previously Presented) The method of claim 46 wherein the isolated L- β -lysine is enantiomerically pure.

60. (Currently Amended) The method of claim **47**[[**46**]] wherein the cofactors required for lysine 2,3-aminomutase activity comprise:

- (i) at least one of ferrous sulfate or ferric ammonium sulfate;
- (ii) pyridoxal phosphate;
- (iii) at least one of dehydrolipoic acid, glutathione or dithiothreitol;
- (iv) S-adenosylmethionine; and
- (v) sodium dithionite.

61. (New) The method of claim 40, wherein the conservative variant of SEQ ID NO: 4 has one amino acid substitution.

62. (New) The method of claim 40, wherein the lysine 2,3-aminomutase has SEQ ID NO: 4.

63. (New) The method of claim 46, wherein the conservative variant of SEQ ID NO: 4 has one amino acid substitution.

64. (New) The method of claim 46, wherein the lysine 2,3-aminomutase has SEQ ID NO: 4.

65. (New) The method of claim 47, wherein the conservative variant of SEQ ID NO: 4 has one amino acid substitution.

66. (New) The method of claim 47, wherein the lysine 2,3-aminomutase has SEQ ID NO: 4.

67. (New) A method of producing L- β -lysine, comprising:

(a) incubating L-lysine in a solution containing purified lysine 2,3-aminomutase, wherein the lysine 2,3-aminomutase has an amino acid sequence selected from the group consisting of (i) SEQ ID NO: 4, and (ii) an amino acid variant of SEQ ID NO: 4 having one or more amino acid substitutions and at least 72% sequence identity to SEQ ID NO: 4, said solution containing all cofactors required for lysine 2,3-aminomutase activity; and

(b) isolating L- β -lysine from the incubation solution.

68. (New) The method of claim 67 wherein the isolated L- β -lysine is enantiomerically pure.

69. (New) The method of claim 67 wherein the amino acid variant of SEQ ID NO: 4 has one amino acid substitution.

70. (New) A method of producing L- β -lysine, comprising:

(a) culturing a prokaryotic host cell comprising an expression vector that encodes lysine 2,3-aminomutase in the presence of L-lysine, wherein the cultured host cell expresses lysine 2,3-aminomutase, and

(b) isolating L- β -lysine from the cultured host cells, wherein the lysine 2,3-aminomutase has an amino acid sequence selected from the group consisting of (i) SEQ ID NO: 4 and (ii) an amino acid variant of SEQ ID NO: 4 having one or more amino acid substitutions and at least 72% sequence identity to SEQ ID NO: 4.

71. (New) The method of claim 47, wherein step (b) further comprises isolating L- β -lysine from L-lysine via chromatography.

72. (New) The method of claim 70 wherein the amino acid variant of SEQ ID NO: 4 has one amino acid substitution.